

1997 Chevrolet S10 Pickup

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INTRODUCTION

The following diagnostic steps help prevent overlooking simple problems. This is also where to begin diagnosis for no-start condition.

The first step in diagnosing any driveability problem is verifying the customer's complaint by test driving vehicle under the conditions in which the problem reportedly occurred.

Before entering self-diagnostics, perform a careful and complete visual inspection. Most engine control problems result from mechanical breakdowns, poor electrical connections or damaged/misrouted vacuum hoses. Before condemning the computerized system, perform each test listed in this article.

NOTE: Unless otherwise instructed in test procedures, perform all voltage tests using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance.

GENERAL MOTORS REFERENCE

System Or Component	Diagnostic Information Location
Malfunction Indicator Light (MIL)	See <u>ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK</u>
DLC & MIL On Steady	See <u>ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK</u>
No Scan Tool Data	See <u>ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK</u>
No-Start Diagnosis	See <u>NO START - ENGINE CRANKS OKAY</u>
Injector Circuit Diagnosis	See <u>BASIC FUEL SYSTEM CHECKS</u>
Fuel Pump Relay	See MODULES, MOTORS, RELAYS & SOLENOIDS in SYSTEM/COMPONENT TESTS article
Fuel System Diagnosis	See <u>BASIC FUEL SYSTEM CHECKS</u>
Injector Balance Test	See FUEL SYSTEM in SYSTEM/COMPONENT TESTS article
MAP Sensor	See ENGINE SENSORS & SWITCHES in SYSTEM/COMPONENT TESTS article
Transmission Range Switch	See ENGINE SENSORS & SWITCHES in SYSTEM/COMPONENT TESTS article
IAC Valve	See IDLE CONTROL SYSTEM under FUEL SYSTEM in SYSTEM/COMPONENT TESTS article
Fuel Evaporation Control	See EMISSION SYSTEMS & SUB-SYSTEMS in SYSTEM/COMPONENT TESTS article
Ignition Control Circuit	See IGNITION SYSTEM in SYSTEM/COMPONENT TESTS article

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Knock Sensor Check	See IGNITION SYSTEM in SYSTEM/COMPONENT TESTS article
EGR System	See EMISSION SYSTEMS & SUB-SYSTEMS in SYSTEM/COMPONENT TESTS article
Torque Converter Clutch	(1) See MISCELLANEOUS PCM/VCM CONTROLS in SYSTEM/COMPONENT TESTS article
Manual Trans. Shift Lights	(1) See MISCELLANEOUS PCM/VCM CONTROLS in SYSTEM/COMPONENT TESTS article
A/C Clutch Control	See MISCELLANEOUS PCM/VCM CONTROLS in SYSTEM/COMPONENT TESTS article
Elec.Cooling Fan Control	(2) See MISCELLANEOUS PCM/VCM CONTROLS in SYSTEM/COMPONENT TESTS article
(1) Complete coverage in TRANSMISSION SERVICING article.	
(2) Covered in entirety in A/C-HEATER SYSTEM article.	

PRELIMINARY INSPECTION & ADJUSTMENTS

VISUAL INSPECTION

Visually inspect all electrical wiring. Look for chafed, stretched, cut or pinched wiring. Ensure electrical connectors fit tightly and are not corroded. Ensure vacuum hoses are properly routed and not pinched or cut. If necessary, see VACUUM DIAGRAMS article to verify routing and connections. Inspect air induction system for possible vacuum leaks.

MECHANICAL INSPECTION

Compression

Check engine mechanical condition with a compression gauge, vacuum gauge, or an engine analyzer. See engine analyzer manual for specific instructions. For compression specifications, see the SPECIFICATIONS article.

WARNING: Because fuel injectors on many models are triggered by ignition switch during cranking mode, DO NOT use ignition switch during compression tests. Use a remote starter to crank engine to prevent fire hazard or engine's oiling system contamination.

Exhaust System Backpressure

Before replacing any components, check exhaust system for restrictions. Use a vacuum gauge or a low-pressure (0-5 psi) gauge to check exhaust system.

If a vacuum gauge is used, connect vacuum gauge hose to intake manifold vacuum port and start engine. Observe vacuum gauge. Partially open throttle and hold steady. If vacuum gauge reading slowly drops after

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stabilizing, exhaust system should be checked for a restriction. If using a low pressure gauge, connect gauge in the following manner:

- Check At Oxygen Sensor

Remove oxygen sensor. Install backpressure tester in place of oxygen sensor. After test is completed, coat oxygen sensor threads with anti-seize compound before installation.

Diagnosis

1. Start engine and bring to operating temperature. Increase engine speed to 2000-2500 RPM and note gauge. If reading exceeds 1.25 psi (.09 kg/cm²), exhaust system is restricted.
2. Check exhaust system for collapsed pipe, heat distress and possible internal muffler failure. If none of these conditions exist, check for restricted catalytic converter. Replace as required.

NO-START DIAGNOSIS

NOTE: For terminal and circuit ID, see the **WIRING DIAGRAMS** article.

DEFINITION

No-start is defined as engine cranks okay but does not start. Engine may fire a few times.

NO START - ENGINE CRANKS OKAY

NOTE: Before performing following tests, check battery condition, engine cranking speed and fuel supply.

General Inspection

1. Ensure proper starting procedure is being used. Visually check vacuum hoses for splits, kinks and proper connections as shown on Vehicle Emission Control Information label. Check ignition wires for cracking, hardness and proper connections at both coil pack and spark plugs.
2. Remove spark plugs. Check and replace as necessary. In very cold temperatures, ensure oil is proper viscosity and not contaminated with gasoline.

Ignition System

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK**. After performing OBD system check, go to next step.
2. Check for Diagnostic Trouble Codes (DTCs). If DTC P0601, P0602 or P1621 is present, diagnose DTC(s). See the TESTS W/CODES article. If DTC(s) is not present, go to next step.
3. Check PCM ground connection at engine block. Repair as necessary. After repairs, go to next step. If ground connection is okay, go to step 5).
4. Check fuel pump and injector ignition feed fuse. If fuse is okay, go to step 6). If fuse is blown, go to step

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- 7).
5. Repair PCM ground connection. After repairs, go to step 42).
6. Check fuel level in tank and add fuel if necessary. If fuel level is okay, go to step 8). If fuel level was low and fuel needed to be added, go to step 42).
7. Check for short to ground in fuel pump and injector ignition feed circuit. Repair as necessary. Replace defective fuse. After repairs, go to step 42).
8. Install scan tool. Turn ignition on, with engine off. Ensure throttle is closed. Scan TP sensor. TP sensor value should be less than one volt. If TP sensor value is as specified, go to next step. If TP sensor value is not as specified, diagnose problem using DTC P0123. See the TESTS W/CODES article.
9. Using scan tool, monitor Engine Coolant Temperature (ECT) sensor and Intake Air Temperature (IAT) sensor values. Both values should be about the same. If values are the same, go to next step. If values are not the same, diagnose problem using DTC P0118. See the TESTS W/CODES article.
10. Check MAP sensor value with ignition on and engine cranking. If MAP sensor value is greater than 4 volts, then changes while cranking engine, go to next step. If MAP sensor value is less than 4 volts and does not change while cranking engine, go to step 12).
11. Using scan tool, check Crankshaft Position (CKP) sensor activity while cranking engine. If CKP ACTIVITY COUNTER increments while cranking, go to step 14). If CKP ACTIVITY COUNTER does not increment, go to step 15).
12. If serial data was lost while cranking engine, go to next step. If serial data was not lost while cranking engine, diagnose MAP sensor. See the SYSTEM/COMPONENT TESTS article.
13. Repair voltage loss to PCM from ignition switch. After repairs, go to step 42).
14. Install Spark Tester (J-26792) to cylinder No. 1, 2, 3 and 4 (one at a time). Connect the spark plug wire of companion cylinder to ground. Crank engine and observe spark tester. If spark is present, go to step 38). If spark is not present, go to step 21).
15. Turn ignition off. Disconnect 6-pin Ignition Control Module (ICM) connector. Turn ignition on. Connect DVOM between ICM connector CKP sensor ground terminal and CKP sensor signal terminal. See the WIRING DIAGRAMS article. Check combined CKP sensor and resistance. Resistance should be 700-1300 ohms. If resistance is as specified, go to step 17). If resistance is not as specified, go to next step.
16. Remove CKP sensor. Ensure CKP sensor is still magnetized and terminals are not damaged. Using DVOM, check CKP resistance. Resistance should be 700-1300 ohms. If resistance is as specified, go to step 19). If resistance is not as specified, go to step 20).
17. Set DVOM to AC scale. Connect DVOM between ICM connector CKP sensor ground terminal and CKP sensor signal terminal. See the WIRING DIAGRAMS article. Crank engine. Voltage reading should be greater than 200 millivolts (mV). If voltage reading is as specified, go to next step. If voltage reading is not as specified, go to step 20).
18. Using a test light connected to battery positive, touch ICM connector 7X reference signal terminal, then reference low terminal. See the WIRING DIAGRAMS article. Monitor CKP ACTIVITY COUNTER increment on scan tool. If increment changes one count as test light is touched to ICM reference low terminal, go to step 31). If increment does not change, go to step 25).
19. Repair open or short in CKP sensor. After repairs, go to step 42).
20. Replace CKP sensor. After replacing CKP sensor, go to step 42).
21. If spark is present at one or more cylinders, go to step 27). If spark is not present at one or more cylinders, go to next step.

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22. Turn ignition off. Disconnect 2-pin Ignition Control Module (ICM) connector. Turn ignition on. Using a test light, probe ICM connector ignition positive voltage terminal and ground terminal. See the WIRING DIAGRAMS article. If test light illuminates, go to step 27). If test light does not illuminate, go to next step.
23. Using a test light connected to ground, probe ICM connector ignition positive voltage terminal. If test light illuminates, go to next step. If test light does not illuminate, go to step 26).
24. Repair faulty ground circuit. After repairs, go to step 42).
25. Check CKP activity (7X reference) circuit for an open or short. Repair circuit as necessary. After repairs, go to step 42). If circuit is okay, go to step 32).
26. Repair faulty power circuit. After repairs, go to step 42).
27. Measure resistance of cable that would not produce spark with spark tester. If resistance is less than 30,000 ohms, go to next step. If resistance is greater than 30,000 ohms, go to step 36).
28. Check secondary resistance of ignition coil that did not produce a spark. Resistance should be 5000-8000 ohms. If resistance is not as specified, go to step 37). If resistance is as specified, go to next step.
29. Turn ignition off. Disconnect 6-pin Ignition Control Module (ICM) connector. Using a DVOM connected to ground, probe ICM connector ignition control terminals. See the WIRING DIAGRAMS article. If resistance is 600-2600 ohms, go to next step. If resistance is not 600-2600 ohms, go to step 33).
30. Install a known-good ignition coil. Reconnect ICM connector. Install Spark Tester (J-26792) to faulty cylinder. Connect the spark plug wire of companion cylinder to ground. Crank engine and observe spark tester. If spark is present, go to step 42). If spark is not present, go to next step.
31. Replace ICM. After replacing ICM, go to step 42).
32. Check for faulty PCM connector or connection. If connector and connection are okay, go to step 35). If connector and connection are faulty, go to step 34).
33. Check ignition control circuit of faulty cylinder for an open or short. Repair circuit as necessary. After repairs, go to step 42). If circuit is okay, go to step 35).
34. Repair connector or connection. After repairs, go to step 42).
35. Replace PCM. Perform PCM relearn procedures. After replacing PCM, go to step 42).
36. Replace faulty spark plug wires. After repairs, go to step 42).
37. Replace faulty ignition coils. After repairs, go to step 42).
38. Disconnect all injector connectors. Connect injector test light to injector No. 1, 2, 3 and 4 (one at a time). Crank engine and observe injector test light. Test light should flash on all tests. If test light flashed, go to next step. If test light did not flash on all tests, or flashed only on one of the tests, or was on steady on one or all tests, go to step 41).
39. Install fuel pressure gauge. Turn ignition on and note fuel pressure after 2 seconds. Fuel pressure should be 41-47 psi (2.9-3.3 kg/cm²). If fuel pressure is as specified, go to next step. If fuel pressure is not as specified, go to FUEL SYSTEM.
40. Check for fouled spark plugs. Replace as necessary. If spark plugs were fouled, go to step 42). If spark plugs were okay, check for water in fuel system. Check for basic engine problem (low compression). Ensure spark plugs are of resistor type. Check fuel pump operation with scan tool.
41. Repair open in fuel pump and injector ignition feed circuit. After repairs, go to next step.
42. Using scan tool, clear DTC(s). Attempt to start engine. If engine starts and continues to run, go to next step. If engine does not start, or starts but dies, go to step 2).

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43. Warm engine to operating temperature. Check for DTCs. If DTCs are present, go to the TESTS W/CODES article. If DTC(s) are not present, system is okay.

Fuel System

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** . After performing OBD system check, go to next step.
2. Ensure fuel pump relay fuse is okay. If fuse is okay, go to next step. If fuse is faulty, go to step 20).
3. Install scan tool. Turn ignition on. Using scan tool, command fuel pump on. Fuel pump should operate for about 2 seconds. If fuel pump operates as specified, diagnose fuel system. See **BASIC FUEL SYSTEM CHECKS** . If fuel pump does not operate, go to next step.
4. Remove fuel pump relay. Using a fused jumper wire, jumper fuel pump relay feed terminal and fuel pump relay ignition feed terminal. See the WIRING DIAGRAMS article. If fuel pump operates, go to next step. If fuel pump does not operate, go to step 6).
5. Using a test light connected to ground, probe fuel pump relay control terminal. See the WIRING DIAGRAMS article. Using scan tool, command fuel pump on. If test light illuminates, go to step 7). If test light does not illuminate, go to step 8).
6. Using a test light connected to ground, probe fuel pump relay ignition feed terminal. See the WIRING DIAGRAMS article. If test light illuminates, go to step 9). If test light does not illuminate, go to step 10).
7. Using a test light connected to battery voltage, probe fuel pump relay ground terminal. See the WIRING DIAGRAMS article. If test light illuminates, go to step 11). If test light does not illuminate, go to step 12).
8. Check for an open or short to ground in fuel pump relay control circuit. Repair as necessary. After repairs, go to step 25). If circuit is okay, go to step 13).
9. Reinstall fuel pump relay. Disconnect fuel pump connector at fuel pump. Using a test light connected to ground, probe fuel pump connector feed terminal (body side). Using scan tool, command fuel pump on. If test light illuminates, go to step 14). If test light does not illuminate, go to step 15).
10. Repair open in ignition feed circuit to fuel pump relay. After repairs, go to step 25).
11. Replace fuel pump relay. After repairs, go to step 25).
12. Repair open in ground circuit to fuel pump relay. After repairs, go to step 25).
13. Check connections and terminals to PCM. Repair as necessary. After repairs, go to step 25). If connections and terminals are okay, go to step 16).
14. Using a test light connected to battery voltage, probe fuel pump ground terminal (body side). If test light illuminates, go to step 17). If test light does not illuminate, go to step 18).
15. Repair open in fuel pump feed circuit. After repairs, go to step 25).
16. Replace PCM. Perform PCM relearn procedures. After replacing PCM, go to step 25).
17. Check for an open in fuel pump feed circuit and ground circuit. Repair as necessary. After repairs, go to step 25). If circuit is okay, go to step 19).
18. Repair open in fuel pump ground circuit. After repairs, go to step 25).
19. Replace fuel pump. After repairs, go to step 25).
20. Disconnect fuel pump connector at fuel pump. Remove fuel pump relay. Turn ignition off. Using a test light connected to battery voltage, probe fuel pump feed terminal. If test light illuminates, go to next step.

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If test light does not illuminate, go to step 22).

21. Repair short to ground in fuel pump feed circuit. After repairs, go to step 25).
22. Using a test light connected to battery voltage, probe fuel pump relay ignition feed terminal. If test light illuminates, go to next step. If test light does not illuminate, go to step 24).
23. Repair short to ground in fuel pump relay ignition feed circuit. After repairs, go to step 25).
24. Check for short to ground in fuel pump fuel pump feed circuit. Repair as necessary. After repairs, go to next step. If circuit is okay, go to step 19).
25. Using scan tool, clear DTC(s). Attempt to start engine. If engine starts and continues to run, go to next step. If engine does not start, or starts but dies, go to step 2).
26. Warm engine to operating temperature. Check for DTCs. If DTCs are present, go to the TESTS W/CODES article. If DTC(s) are not present, system is okay.

BASIC FUEL SYSTEM CHECKS

FUEL SYSTEM PRESSURE RELIEF

WARNING: Begin fuel system trouble shooting and diagnosis with fuel system pressure test. Relieve fuel system pressure before disconnecting any components or installing fuel pressure gauge.

Fuel system is under pressure, which must be relieved before servicing fuel system. Fuel pressure may be relieved by the following method:

- Disconnect negative battery cable. Loosen fuel filler cap. Install Fuel Pressure Gauge (J-34730-1A) to fuel pressure test head. Wrap shop towel around pressure connection when installing fuel pressure gauge to absorb fuel leakage. Place gauge bleed hose in container. Open bleed valve to relieve fuel pressure.

FUEL SYSTEM PRESSURE TEST

WARNING: Begin fuel system trouble shooting and diagnosis with fuel system pressure test. Relieve fuel system pressure before disconnecting any components or installing fuel pressure gauge.

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** . After performing OBD system check, go to next step.
2. Relieve fuel pressure. See **FUEL SYSTEM PRESSURE RELIEF** . Connect Fuel Pressure Gauge Kit (J-29658-D) to fuel pressure connector. Turn ignition on with engine off. With fuel pump running, fuel pressure should be 41-47 psi (2.9-3.3 kg/cm²). If fuel pressure is as specified, go to next step. If fuel pressure is not as specified, go to step 12).
3. Wait for fuel pump to stop running. Observe fuel pressure after 10 minutes. Fuel pressure should remain within 5 psi (.35 kg/cm²) of specified pressure. If pressure drops more than 5 psi (.35 kg/cm²), go to step 10). If pressure remains within 5 psi (.35 kg/cm²) of specified pressure, go to next step.
4. Relieve fuel pressure until pressure is 10 psi (.7 kg/cm²). Observe fuel pressure after 10 minutes. Fuel

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pressure should remain within 2 psi (.14 kg/cm²) of specified pressure. If pressure drops more than 2 psi (.14 kg/cm²), go to step 21). If pressure remains within 2 psi (.14 kg/cm²) of specified pressure, go to next step.

5. If fuel pressure is suspected of dropping off during acceleration, cruise or hard cornering, go to next step. If fuel pressure is as specified, go step 8).
6. Inspect fuel filter and fuel supply line. Repair or replace as necessary. After repairs, go to step 23). If fuel filter and fuel supply line are okay, go to next step.
7. Remove fuel sending unit from fuel tank. Inspect fuel pump strainer for restriction, fuel pump flex pipe for leaks, or verify if fuel pump is of right application. Repair or replace as necessary. After repairs, go to step 23). If no problems are found, go to step 20).
8. Start and warm engine to normal operating temperature. Allow engine to idle. Observe fuel pressure gauge. Fuel pressure should drop 3-10 psi (.2-.7 kg/cm²). If fuel pressure drop is as specified, see the TESTS W/O CODES article. If fuel pressure drop is not as specified, go to next step.
9. Disconnect vacuum hose to fuel pressure regulator. With engine at idle, apply 12-14" Hg vacuum to fuel pressure regulator using a vacuum pump. Fuel pressure should drop 3-10 psi (.2-.7 kg/cm²). If fuel pressure drop is as specified, go to step 19). If fuel pressure drop is not as specified, go to step 20).
10. Relieve fuel pressure. See **FUEL SYSTEM PRESSURE RELIEF**. Connect Fuel Pressure Gauge Kit (J-29658-D) to fuel pressure connector. Using scan tool, pressurize fuel system. Bleed air out of fuel gauge. Wait for pressure to build up. Pinch fuel return hose. If fuel pressure remains constant, go to step 21). If fuel pressure does not remain constant, go to next step.
11. Using scan tool, pressurize fuel system. Wait for pressure to build up. Pinch fuel return hose. If fuel pressure remains constant, go to step 20). If fuel pressure does not remain constant, go to step 22).
12. If fuel pressure is greater than 47 psi (3.3 kg/cm²), go to next step. If fuel pressure is less than 47 psi (3.3 kg/cm²), go to step 15).
13. Relieve fuel pressure. See **FUEL SYSTEM PRESSURE RELIEF**. Disconnect fuel return line from fuel rail. Attach a piece of fuel hose to return line and place in a container. Turn ignition off for about 10 seconds. Turn ignition on. Observe fuel pressure with fuel pump operating. Fuel pressure should be 41-47 psi (2.9-3.3 kg/cm²). If fuel pressure is as specified, go to step 23). If fuel pressure is not as specified, go to next step.
14. Inspect fuel rail return/outlet passage for restriction. If restriction is present, go to step 24). If restriction is not present, go to step 20).
15. If fuel pressure is not present, go to next step. If fuel pressure is present, go to step 17).

CAUTION: DO NOT allow fuel pressure to exceed 65 psi (4.5 kg/cm²).

16. Relieve fuel pressure. See **FUEL SYSTEM PRESSURE RELIEF**. Connect Fuel Pressure Gauge Kit (J-29658-D). Using scan tool, pressurize fuel system. Bleed air out of fuel gauge. Wait for pressure to build up. Slowly pinch fuel return hose. Fuel pressure should be 41-47 psi (2.9-3.3 kg/cm²). If fuel pressure increases to greater than specification, go to step 20). If fuel pressure does not increase to greater than specification, go to step 7).
17. Check fuel system electrical circuits. See FUEL SYSTEM under **NO-START DIAGNOSIS**. If fuel

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pump circuit is faulty, go to step 24). If fuel pump circuit is okay, go to next step.

18. Inspect fuel filter for obstruction, fuel supply line for restriction, fuel pump strainer for obstructions or fuel pump flex pipe for leaks. Repair or replace as necessary. After repairs, go to step 24). If problem was not found, go to step 21).
19. Locate and repair vacuum leak to fuel pressure regulator. After repairs, system is okay.
20. Replace fuel pressure regulator. After repairs, system is okay.
21. Replace fuel sending unit. After repairs, system is okay.
22. Locate and replace any leaking fuel injector(s). After repairs, system is okay.
23. Locate and correct restriction in fuel return line. After repairs, system is okay.
24. Repair problem as necessary. After repairs, system is okay.

BASIC IGNITION SYSTEM CHECKS

NOTE: To diagnose ignition system, see appropriate **IGNITION SYSTEM** test in **NO-START DIAGNOSIS** .

IDLE SPEED & IGNITION TIMING

Ensure idle speed and ignition timing are set to specifications. For specifications, see SPECIFICATIONS article. For adjustment procedures, see ADJUSTMENTS article.

ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK

NOTE: Use of Tech 1 scan tool is required to perform **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** .

The OBD System Check determines:

- If Malfunction Indicator Light (MIL) works.
- If PCM/VCM is operating and can recognize a fault.
- If any Diagnostic Trouble Codes (DTCs) are stored.

After performing procedures in PRELIMINARY INSPECTION & ADJUSTMENTS, **BASIC FUEL SYSTEM CHECKS** and BASIC IGNITION SYSTEM CHECKS, this is the starting point for utilizing the self-diagnostic system for determining computer-related problems. After performing necessary tests as described in the OBD system circuit check, if no codes are indicated and driveability problems still exist, see the TESTS W/O CODES article and SCAN TOOL usage in the TESTS W/CODES article.

1. Turn ignition on with engine off. If Malfunction Indicator Light (MIL) illuminates, go to next step. If MIL does not illuminate, go to MIL INOPERATIVE.
2. Turn ignition off. Install Tech 1 scan tool and follow scan tool manufacturer's instructions to proceed with test. Turn ignition on. If scan tool displays PCM data, go to next step. If scan tool does not display PCM data, go to **DLC DIAGNOSIS OR NO SCAN TOOL DATA** .

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3. Using scan tool, command MIL to turn off. If MIL turns off, go to next step. If MIL does not turn off, go to MIL ON STEADY.
4. Using scan tool, check if any DTC(s) are present. If DTC(s) are present, go to next step. If DTC(s) are not present, go to step 6).
5. Using scan tool, store FREEZE FRAME and FAILURE RECORDS data. Diagnose any stored DTC. See the TESTS W/CODES article.
6. Start engine. If engine starts and runs, go to next step. If engine does not start, or starts and dies, go to NO START DIAGNOSIS.
7. Turn ignition on with engine off. Check Engine Coolant Temperature (ECT) and TP sensors for proper operation. Start and warm engine to normal operating temperature. Check ECT sensor, MAP sensor, O2 sensors, and IAC valve for proper operation. Compare scan tool engine data with actual control system data values. If value is within limits, see the TESTS W/O CODES article. If value is not within limits, go to the SYSTEM/COMPONENT TESTS article.

MALFUNCTION INDICATOR LIGHT (MIL)

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** . After performing OBD system check, go to next step.
2. Turn ignition on with engine off. If Malfunction Indicator Light (MIL) illuminates, go to next step. If MIL does not illuminate, go to step 4).
3. Check for poor connections at battery feed circuit or ignition positive voltage 1 circuit. Repair as necessary. After repairs, go to step 22). If circuits are okay, go to step 5).
4. Attempt to start engine. If engine starts, go to step 6). If engine does not start, go to step 7).
5. Check for poor PCM ground connection on engine block or PCM connector ground terminals. Repair as necessary. After repairs, go to step 22).
6. Turn ignition off. Disconnect PCM connectors. Turn ignition on. Using a test light connected to ground, probe MIL control circuit. See the WIRING DIAGRAMS article. If MIL illuminates, go to step 8). If MIL does not illuminate, go to step 9).
7. Check ignition and battery feed fuses. If fuses are okay, go to step 10). If fuses are blown, go to step 11).
8. Check for poor battery feed, ignition positive voltage 1 or MIL control circuit connections. Repair as necessary. After repairs, go to step 22). If circuits are okay, go to step 12).
9. If test light illuminates, go to step 13). If test light does not illuminate, go to step 14).
10. Turn ignition off. Disconnect PCM connectors. Turn ignition on. Using a test light connected to ground, probe ignition positive voltage 2 circuit. See the WIRING DIAGRAMS article. If test light illuminates, go to step 15). If test light does not illuminate, go to step 16).
11. Check for short to ground in fuse circuit that was open. Repair as necessary and replace fuse. After repairs, go to step 22).
12. Replace PCM. Perform PCM relearn procedures. After repairs, go to step 22).
13. Repair short to voltage in MIL control circuit. After repairs, go to step 22).
14. Check for open or poor connection in MIL control circuit. See the WIRING DIAGRAMS article. Repair as necessary. After repairs, go to step 22). If circuit is okay, go to step 17).
15. Using a test light connected to ground, probe ignition positive voltage 1 circuit. See the WIRING

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DIAGRAMS article. If test light illuminates, go to step 18). If test light does not illuminate, go to step 19).

16. Repair open in battery feed circuit. After repairs, go to step 22).
17. Check for open in ignition feed circuit or fuse to MIL. See the WIRING DIAGRAMS article. Repair as necessary. After repairs, go to step 22). If circuit or fuse is okay, go to step 20).
18. Check for poor connections at battery feed circuit or ignition positive voltage 1 circuit. Repair as necessary. After repairs, go to step 22). If circuits are okay, go to step 21).
19. Repair open in ignition positive voltage 1 circuit. After repairs, go to step 22).
20. Replace Instrument Panel Cluster (IPC). After IPC replacement, go to step 22).
21. Check for poor PCM ground connection on engine block or PCM connector. Repair as necessary. After repairs, go to next step. If connection and connector are okay, go to step 12).
22. Warm engine to operating temperature. Check for DTCs. If DTCs are present, go to the TESTS W/CODES article. If DTC(s) are not present, system is okay.

MIL ON STEADY

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** . After performing OBD system check, go to next step.
2. Turn ignition on with engine off. MIL should illuminate. If MIL does not illuminate, go to **MALFUNCTION INDICATOR LIGHT (MIL)** . If MIL illuminates, go to next step.
3. Install scan tool. Using scan tool, command MIL on and off. If MIL turns on and off when commanded, go to step 8). If MIL does not turn on and off when commanded, go to next step.
4. Turn ignition off. Disconnect PCM connectors. Turn ignition on. If MIL does not illuminate, go to step 7). If MIL illuminates, go to next step.
5. Check for short to ground in MIL control circuit. See the WIRING DIAGRAMS article. Repair as necessary. After repairs, go to step 8). If circuit is okay, go to next step.
6. Replace Instrument Panel Cluster (IPC). After IPC replacement, go to step 8).
7. Replace PCM. Perform PCM relearn procedures. After repairs, go to next step.
8. Using scan tool, clear DTC(s). Attempt to start engine. If engine starts and runs, go to next step. If engine does not start, or starts and dies, go to step 1).
9. Warm engine to operating temperature. Check for DTCs. If DTCs are present, go to the TESTS W/CODES article. If DTC(s) are not present, system is okay.

DLC DIAGNOSIS OR NO SCAN TOOL DATA

1. Perform On-Board Diagnostic (OBD) System Check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** . After performing OBD system check, go to next step.
2. Turn ignition on with engine off. Install scan tool. If scan tool is equipped with external power source, ensure power source and ground are okay. If scan tool powers up, go to next step. If scan tool does not power up, go to step 5).
3. Using scan tool, attempt to communicate with other control modules. If scan tool communicates with other control modules, go to step 10). If scan tool does not communicate with other control modules, go to next step.

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4. Turn ignition off. Disconnect PCM connectors. Turn ignition on. Using scan tool, attempt to communicate with other control modules. If scan tool communicates with other control modules, go to step 12). If scan tool does not communicate with other control modules, go to step 11).
5. Using a test light connected to ground, probe DLC battery feed circuit. See the **WIRING DIAGRAMS** article. If test light illuminates, go to next step. If test light does illuminate, go to step 7).
6. Using a test light connected to battery voltage, probe DLC ground circuits. See the **WIRING DIAGRAMS** article. If test light illuminates for both ground circuits, go to step 8). If test light does not illuminate for both ground circuits, go to step 9).
7. Repair open or short to ground in DLC battery feed circuit. After repairs, go to step 15).
8. Check DLC for proper terminal tension or excessive resistance. Repair as necessary. After repairs, go to step 15). If terminals are okay, go to step 14).
9. Repair open or poor connection(s) in DLC ground circuit(s). After repairs, go to step 15).
10. Check for open in class 2 serial data circuit between PCM and splice connection. Repair as necessary. After repairs, go to step 15). If circuit is okay, go to step 12).
11. Check for open or short in class 2 serial data circuit between PCM and DLC. Repair as necessary. After repairs, go to step 15). If circuit is okay, go to step 13).
12. Replace PCM. Perform PCM relearn procedures. After repairs, go to step 15).
13. Install scan tool on another vehicle equipped with class 2 serial data and check for proper operation. If scan tool operates properly, diagnose vehicle computer system. If scan tool does not operate properly, go to next step.
14. Scan tool is malfunctioning. Using scan tool operation manual, repair as necessary. After repairs, go to next step.
15. Using scan tool, clear DTC(s). Warm engine to operating temperature. Operate vehicle within conditions required to set DTC. If scan tool indicates diagnostic ran and passed, go to next step. If scan tool does not indicate diagnostic ran and passed, go to step 2).
16. Check if any additional DTC(s) are set. If additional DTC(s) are present, diagnose DTC(s). See the **TESTS W/CODES** article. If DTC(s) are not present, system is okay.

SUMMARY

If no faults were found while performing **BASIC DIAGNOSTIC PROCEDURES**, no trouble codes (or only intermittent ones) were found while performing **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** and driveability problems exist, proceed to the **TESTS W/O CODES** article for diagnosis by symptom (i.e., **ROUGH IDLE**, **NO-START**, etc.) or intermittent diagnostic procedures.